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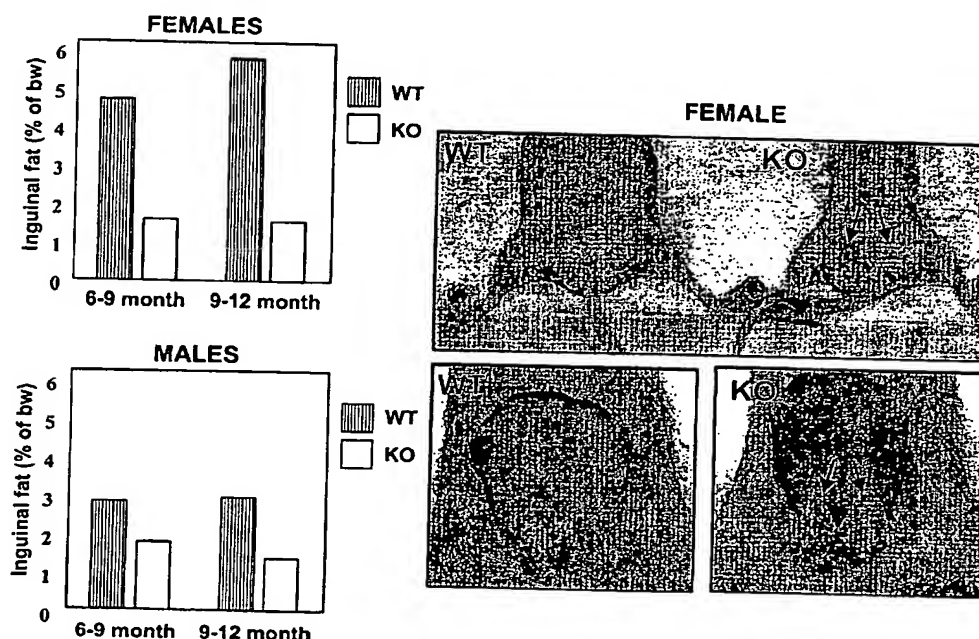
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[Continued on next page]

(54) Title: SCREENING FOR MODULATORS OF FAT STORAGE



(57) Abstract: This invention relates to screening methods for identifying compounds that are useful as modulators of fat storage. In particular, the invention provides methods of screening for compounds that modulate the function of receptor interacting protein 140 (RIP 140).



TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

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# INTERNATIONAL SEARCH REPORT

PCT/GB2004/000413

**A. CLASSIFICATION OF SUBJECT MATTER**  
 IPC 7 G01N33/68 A61P3/04

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
 IPC 7 G01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EP0-Internal, BIOSIS, Sequence Search, EMBASE, PAJ, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WHITE R ET AL: "The nuclear receptor co-repressor nr1p1 (RIP140) is essential for female fertility" NATURE MEDICINE, NATURE AMERICA, NEW YORK, US, vol. 6, no. 12, December 2000 (2000-12), pages 1368-1374, XP002258567 ISSN: 1078-8956 abstract page 1369, column 1; figure 2	1-11,15, 16
A	EP 1 267 171 A (INST NAT SANTE RECH MED) 18 December 2002 (2002-12-18) paragraphs [0009], [0031], [0163]; figures 3,4; example 6 ----- -/--	1-11,15, 16

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

\* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search

13 May 2004

Date of mailing of the international search report

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Name and mailing address of the ISA

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## INTERNATIONAL SEARCH REPORT

PCT/GB2004/000413

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2002/004205 A1 (GRAY JOHN G ET AL) 10 January 2002 (2002-01-10) paragraphs [0018] - [0021]; figures 2-4,6 -----	1-11,15, 16
A	US 6 266 622 B1 (APRILETTI JAMES J ET AL) 24 July 2001 (2001-07-24) example 3; table 3 -----	1-11,15, 16
A	YAMAUCHI TOSHIMASA ET AL: "The mechanisms by which both heterozygous peroxisome proliferator-activated receptor gamma (PPARGamma) deficiency and PPARGamma agonist improve insulin resistance" JOURNAL OF BIOLOGICAL CHEMISTRY, vol. 276, no. 44, 2 November 2001 (2001-11-02), pages 41245-41254, XP002279645 ISSN: 0021-9258 abstract page 41245, column 2 page 41253, column 2, paragraph 4 -----	1
A	PALOU A ET AL: "Obesity: Molecular bases of a multifactorial problem" EUROPEAN JOURNAL OF NUTRITION, vol. 39, no. 4, August 2000 (2000-08), pages 127-144, XP002279646 ISSN: 1436-6207 page 135 - page 136, column 1; table 1 -----	1

# INTERNATIONAL SEARCH REPORT

PCT/GB2004/000413

## Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: 17, 22  
because they relate to subject matter not required to be searched by this Authority, namely:  
Although claims 1-11 directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the binding between RIP140 and modulation of fat storage.
2. ☒ Claims Nos.: 12-14, 17-22  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:  
see FURTHER INFORMATION sheet PCT/ISA/210
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:  
1-12 , 13, 14-22 partially

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

## Continuation of Box II.1

Although claims 1-11 directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the binding between RIP140 and modulation of fat storage.

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## Continuation of Box II.1

Claims Nos.: 17,22

Rule 39.1(iv) PCT - Method for treatment of the human or animal body by therapy

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## Continuation of Box II.2

Claims Nos.: 12-14,17-22

Present claims 12-14, 17-22 and 15-16 (in as far as they depend on claims 12-14) relate to a compound/pharmaceutical composition and their use defined by reference to a desirable characteristic or property, namely obtained or obtainable by a method of claim 1.

The claims cover all compounds/pharmaceutical compositions and their use having this characteristic or property, whereas the application provides no support within the meaning of Article 6 PCT and/or disclosure within the meaning of Article 5 PCT for such compounds/pharmaceutical compositions. In the present case, the claims so lack support, and the application so lacks disclosure, that a meaningful search over the whole of the claimed scope is impossible. Independent of the above reasoning, the claims also lack clarity (Article 6 PCT). An attempt is made to define the compound/pharmaceutical composition by reference to a result to be achieved. Again, this lack of clarity in the present case is such as to render a meaningful search over the whole of the claimed scope impossible. Consequently, no search has been carried out for claims 12-14 and 17-22 and claims 15-16, in as far as they depend on claims 12-14.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

before the EP0, the applicant is reminded that a search may be carried out during examination before the EP0 (see EP0 Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: Claims 1-12 (partially), 13,14-22 (partially)

Screening for compounds that modulate fat storage in a mammal comprising identifying a compound which binds to RIP140, compounds and pharmaceutical compositions derived therefrom as well as their use.

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2. claims: Claims 1-12 (partially), 14-22 (partially)

Screening for compounds that modulate fat storage in a mammal comprising identifying a compound which binds to the RIP140 target protein AhR, compounds and pharmaceutical compositions derived therefrom as well as their use.

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3. claims: Claims 1-12 (partially), 14-22 (partially)

Screening for compounds that modulate fat storage in a mammal comprising identifying a compound which binds to the RIP140 target protein ER, compounds and pharmaceutical compositions derived therefrom as well as their use.

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4. claims: Claims 1-12 (partially), 14-22 (partially)

Screening for compounds that modulate fat storage in a mammal comprising identifying a compound which binds to the RIP140 target protein RAR, compounds and pharmaceutical compositions derived therefrom as well as their use.

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5. claims: Claims 1-12 (partially), 14-22 (partially)

Screening for compounds that modulate fat storage in a mammal comprising identifying a compound which binds to the RIP140 target protein TR, compounds and pharmaceutical compositions derived therefrom as well as their use.

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6. claims: Claims 1-12 (partially), 14-22 (partially)

Screening for compounds that modulate fat storage in a mammal comprising identifying a compound which binds to the RIP140 target protein RXR, compounds and pharmaceutical compositions derived therefrom as well as their use.

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7. claims: Claims 1-12 (partially), 14-22 (partially)



FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Screening for compounds that modulate fat storage in a mammal comprising identifying a compound which binds to the RIP140 target protein VDR, compounds and pharmaceutical compositions derived therefrom as well as their use.

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8. claims: Claims 1-12 (partially), 14-22 (partially)

Screening for compounds that modulate fat storage in a mammal comprising identifying a compound which binds to the RIP140 target protein PPAR, compounds and pharmaceutical compositions derived therefrom as well as their use.

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9. claims: Claims 1-12 (partially), 14-22 (partially)

Screening for compounds that modulate fat storage in a mammal comprising identifying a compound which binds to the RIP140 target protein SF-1, compounds and pharmaceutical compositions derived therefrom as well as their use.

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10. claims: Claims 1-12 (partially), 14-22 (partially)

Screening for compounds that modulate fat storage in a mammal comprising identifying a compound which binds to the RIP140 target protein DAX-1, compounds and pharmaceutical compositions derived therefrom as well as their use.

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# INTERNATIONAL SEARCH REPORT

PCT/GB2004/000413

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1267171	A	18-12-2002	AU 4755502 A	19-12-2002
			CA 2390686 A1	14-12-2002
			EP 1267171 A1	18-12-2002
			JP 2003125773 A	07-05-2003
			US 2003104975 A1	05-06-2003
-----				
US 2002004205	A1	10-01-2002	NONE	
-----				
US 6266622	B1	24-07-2001	US 6236946 B1	22-05-2001
			AU 763452 B2	24-07-2003
			AU 1799999 A	15-06-1999
			BR 9815061 A	20-11-2001
			CA 2314096 A1	03-06-1999
			CN 1290161 T	04-04-2001
			EP 1034184 A2	13-09-2000
			JP 2001524489 T	04-12-2001
			TR 200002257 T2	21-12-2000
			WO 9926966 A2	03-06-1999
			AU 717743 B2	30-03-2000
			AU 1821697 A	03-07-1997
			CA 2240024 A1	19-06-1997
			EP 0873361 A2	28-10-1998
			JP 2000502086 T	22-02-2000
			WO 9721993 A2	19-06-1997
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